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Engaging Opportunities: Connecting young people with contemporary research and researchers

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Engaging Opportunities

Connecting young people
with contemporary research
and researchers



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RCUK Public Engagement with Research Team

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* Contributors are listed in alphabetical order.

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Engaging Opportunities

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This report is dedicated to the memory of Val Hawthorne.

Val worked at Denbigh School for many years and was a friend and supporter of our SUPI work from the start.

Among her contributions, often made behind the scenes, she was instrumental in the planning and organisation of the Water Rocket Competition (Figure 1).



Figure 1: The teams, teachers, judges and support staff for the 2013 Water Rocket Competition. Photo: Mark Russell.



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“We are delighted to have been involved in the Engaging opportunities project. The exciting opportunities offered through this project enabled us to take engagement with OU researchers to the next level. We look forward to continuing our partnership with The Open University. Through school-university engagement we will continue to have a wider impact on students’ aspirations and life chances.”

**Andy Squires,
Headteacher of Denbigh School**



The Story of our SUPI project

‘Engaging opportunities’ was born out of an existing partnership between the Open University (OU) and the Denbigh Teaching School Alliance (DTSA) in Milton Keynes. Our journey has been a collective and cooperative one, characterised by our action research-informed approach (Holliman et al. 2017). Our successes and failures are down to a small, dedicated group of university academics, teachers and support staff, with a supporting cast of many more (see the cover to this report), all committed to improving the aspirations and life chances of children and young people in Milton Keynes.

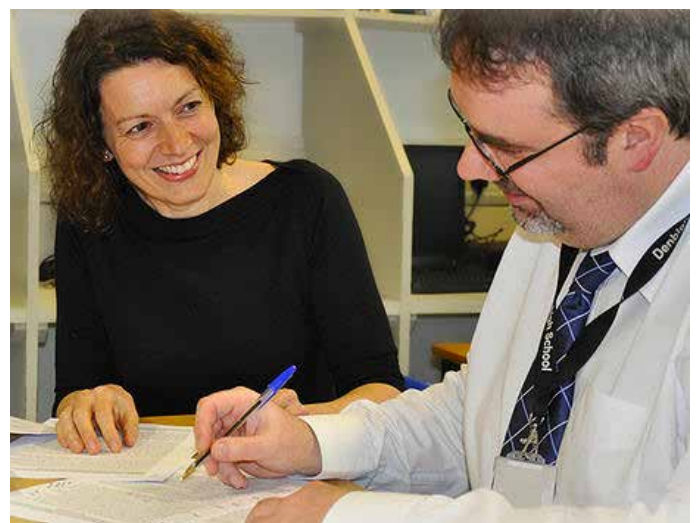
Our SUPI project started in a local school in Milton Keynes with the key leadership influence of an outstanding teacher. In 2012 Andy Squires, then Deputy Headteacher at Denbigh School, emailed Richard Holliman at the OU. At the time Richard was the OU’s Champion for Public Engagement with Research and a key contact point for external engagement. Andy had word of a forthcoming call for proposals, a School University Partnership Initiative (SUPI). Did the OU want to be involved and who could help to put a proposal together to meet the aims of the call?

Andy’s vision and enthusiasm for engaging across the DTSA, and with OU researchers, was infectious. One visit to meet Andy at Denbigh School was sufficient to convince Richard to make a case to the OU’s then Pro Vice-Chancellor, Professor Tim Blackman, that working collaboratively and cooperatively to coordinate direct engagement between students, teachers, and university researchers had the potential to add value to all participating stakeholders.

With a green light to work together, Richard and Andy worked collaboratively with colleagues at the OU and DTSA to: 1. collaboratively author a proposal that met the aims of the call and the requirements of two busy and complex organisations; and 2. put together a proto-project team.

This process was made easier because we shared a vision for school-university engagement with research, one where young people are seen as key ‘publics’ for engaging research. From the conception of our SUPI through all stages of the project we have argued that children and young people are the pool of talent from which the next generation of expertise will develop. They are also prospective citizens with a stake in how research agendas are framed and prioritised. Furthermore, they will have some responsibility for managing the benefits and challenges that arise from the social and economic impact of these studies.

Having secured funding from RCUK for the first three years of the project (during which time Andy became Headteacher at Denbigh School and Richard was co-opted to the DTSA Strategy Board), we codified our partnership in the form of a legal contract, launched a communication strategy to raise awareness of our SUPI and to share learning from the project, submitted the ethics application for our action research-informed approach, registered our project in accordance with Data Protection requirements, and sought clearance for core members of the OU SUPI team to work in schools through Disclosure and Barring Service checks.



Helen Brown and Mark Russell, Denbigh School

Andy formally recruited two new members of the team at Denbigh, Helen Brown (the then Deputy Director of the DTSA, now Director), and Mark Russell, who took on the role of Project Coordinator. The OU organised Visiting Status to these three teachers from Denbigh School to give them operational access to our systems with a view to improving the operational efficiency of the project (e.g. in how we shared information).

At the OU Richard formalised our research and support team, basing the project in a cross-faculty research centre, called **eSTeEM** with project management support from Diane Ford. Over the lifetime of the project we have worked with a wide range of researchers and support staff from across the OU, with several members of staff joining the NCCPE Public Engagement Ambassador Scheme through their SUPI work.

With our distributed team in place at the DTSA and the OU, respectively, we began our planning in earnest mainly through formal monthly meetings. You can see the fruits of our labours in this report.

Having completed the first three years of the project we were given the opportunity to consolidate our learning, and to reinvigorate our shared vision for school-university engagement with research through a further 12 months of funded activity.

This required two important changes in personnel, the first of which was facilitated by the contract between the OU and the DTSA; Mark Russell returned to full-time teaching as Head of Business and Computing at Denbigh School to be replaced by Anthony Steed. The second was an addition to the team. Trevor Collins formally joined our SUPI, principally to support our work on the Extended Project Qualification (EPQ).

The core aims for our RCUK-funded partnership remained the same throughout the four-year project. Informed by a shared mission for social justice we have engaged students from different backgrounds whilst addressing the relevance and impact of research to them. We worked to generate awareness of the nature and challenges of contemporary research. Further, we have worked to foster and extend a culture of reflective practice around school-university engagement

with research; and to embed school-university engagement with research within the OU's and DTSA's strategic planning on a sustainable basis.

With this sustainability agenda in mind we note our strategic efforts to secure a Memorandum of Understanding between the OU and the DTSA, in the first instance for a further two-year period. Operationally, we have continued to organise activities, e.g. lectures, research cafés and Maths resilience workshops. We have also trained researchers, inspiring them to work with young people and teachers from Milton Keynes. Since January 2017 we have supported around 50 postgraduate researchers in the environmental and life sciences, and we are in discussion with the newly-minted Graduate School about an OU-wide training programme. Further, members of our SUPI have continued to engage with the wider context for school-university engagement with research, notably through contributions to the HEFCE Consultation about REF 2021, and the RCUK strategy refresh for public engagement with research.

Since the conclusion of the project Anthony Steed has coordinated a number of legacy projects, pointing to the possibility of a sustainable partnership between the OU and the DTSA. These projects have been built upon the links developed between the two institutions and a mutually understanding as to the benefit of school-university collaboration. Two particular projects of note are the 'Open Justice' Project and the 'Managing My Money – Youth' Project.

Open Justice: As part of the OU's social justice mission, the Law School has developed a new pro bono initiative: **Open Justice**. This project aims to provide OU law students with the opportunity to engage in pro bono activities, comprising an online legal advice clinic and the delivery of public legal education projects.

Building on the existing SUPI partnership between the OU and the DTSA a series of pilot sessions were delivered to Denbigh students during March, 2017. The pilot project will form the basis for the development of similar engagement activities in regions across the UK.



The launch event for Managing My Money – Youth. Denbigh School Students with Bobby Seagull and Andy Squires.

Managing My Money – Youth: This project provides accessible, relevant and free personal finance education to 16-18 year olds within and outside the school environment (Upton, 2017). Building upon SUPI links between the DTSA and the OU, Denbigh School supported the development of the project in a number of ways including:

- » Conduct focus group analysis with 16-18 year olds into financial education needs and study methods, accessing what content is needed and how best to deliver it;
- » Undertake rigorous monitoring and evaluation of the resources and course materials from the perspective of students and teachers as end-users.

Following the launch event for the course, which was held at Denbigh School, students appeared in a range of media including BBC Look East and BBC Radio 5 live.

These projects demonstrate the strength of our continued partnership working. Our challenge for the future is to further cement our shared vision for school-university engagement with research across Milton Keynes, and to continue to do justice to the enthusiasm and commitment of the many students, teachers and researchers with whom we have engaged.



“Through the work of the Engaging opportunities project we have raised awareness among young people in Milton Keynes of the range of academic research that is conducted at the Open University.

We look forward to working in partnership with the Denbigh Teaching School Alliance in the future to help young people to develop skills and competencies that empower lifelong learning and citizenship.”

**Professor Richard Holliman,
The Open University**

Key Findings

Over the four years of our SUPI, from January 2012-December 2016, we have responded to the requirements of the RCUK call for proposals (listed on the back cover), to:

- » Develop an effective partnership between the DTSA and the OU to create structured, strategic, sustainable and equitable mechanisms for effective school-university engagement.
- » Directly engage with 11 schools and more than 6,577 people within Milton Keynes, surpassing our target of 3,800, with authentic practices of contemporary and inspiring research in a range of academic disciplines, offering opportunities to participate in mutual learning and develop relevant and useful skills and competencies in how to access, assess, analyse and respond to contemporary research.
- » Generate awareness of the nature and challenges of contemporary research through four types of activity—open lectures, open dialogues, open inquiry and open creativity—supporting those who wish to make the transition from school to university, whilst facilitating discussion about the social, economic and ethical impacts of research, developing the skills and competencies necessary to become effective citizens.
- » Provide authentic role models for children and young people to aspire to, developing activities that help to build confidence and self-efficacy among students from a diversity of backgrounds and abilities.
- » Inspire researchers through their work with young people and teachers from Milton Keynes, gaining experience in cutting-edge educational practices.
- » Evaluate a sub-set of our activities through an action research-informed approach with a view to creating a culture of reflective and improved practice.
- » Involve and support OU researchers, particularly early career researchers, to engage with school-age students and teachers through opportunities for career and professional development, rewarding and recognising them for excellence in school-university engagement with research.
- » Consolidate and share the learning gained from collaborative and cooperative working across the OU, schools in Milton Keynes, the SUPI network (coordinated by the NCCPE), and the wider higher education sector.

Further to these findings, which have direct relevance to our school-university partnership in Milton Keynes, we have generated findings that have wider relevance across the sector.

See overleaf ➡.

Planning for effective school-university engagement

Upstream planning for school-university engagement with research requires careful, structured thinking involving teachers, researchers and (where relevant and possible) students, supported by effective downstream project management. And yet through our work we noted a lack of suitable planning tools that work for researchers, teachers and students.

Drawing on an activity funded through the RCUK's 'Cutting Edge Research in the Classroom' Scheme, we adapted an existing planning framework (see [Holliman et al., 2015](#)) to support researchers who are planning for school-university engagement with research. Following our action research-informed approach, the framework was developed collaboratively, involving researchers and teachers, and then 'road-tested' and refined. (We have also used this framework to train and support OU researchers as they plan for school-university engagement with research; see [Holliman and Warren, 2017](#).)

Underpinned by the philosophy of pragmatism, the framework is principled in nature and designed to be applicable to any school-university activity. It is therefore designed to be flexible and adaptable, covering: preparedness, politics, people, purposes, processes and performance (Figure 2). We shared the framework in a number of different forms through the Open University's [Engaging Research blog](#), where possible under a Creative Commons licence to promote sharing and re-use.

The framework is discussed in detail, and with a fully worked example, as an academic paper ([Holliman et al., 2017](#)). It is also available in shortened forms, e.g. as a blog post ([Holliman, 2016](#)), through slides supporting training ([Holliman and Davies, 2015](#)), and as a training leaflet ([Holliman et al., 2016](#)).

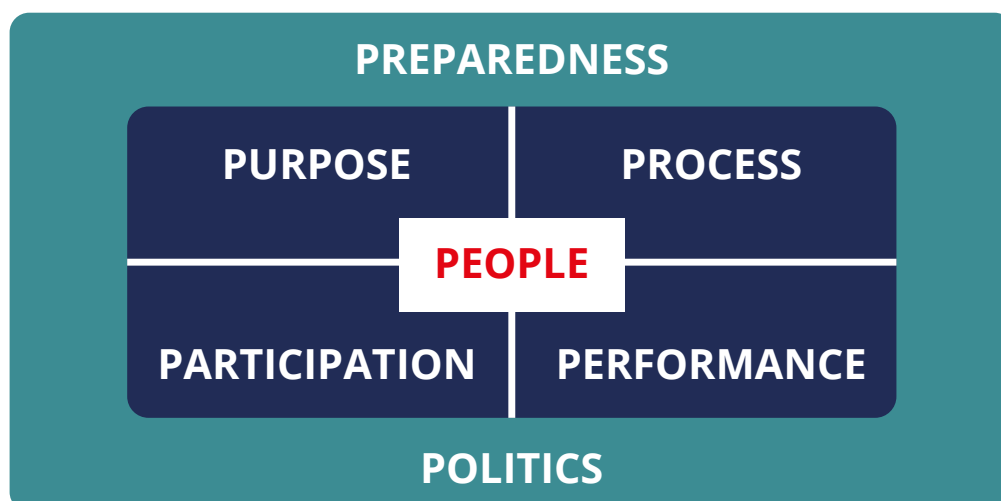


Figure 2: Planning for school-university engagement with research. (Holliman et al. 2017)

Transparent justification of resources

Planning for school-university engagement with research requires a clear justification of resources that addresses questions of value-for-money for potential funders of these activities. Further, the level of commitment from each stakeholder and their institutions needs to be clear from the outset.

To address these related issues we developed a flexible and adaptable 'SUPI Metric' to make explicit the level of engagement required and to support stakeholders (i.e. teachers, pupils and researchers) in measuring that engagement. The formula for the metric is show in Figure 3.

The metric was published in an open access journal (Holliman and Davies, 2015; worked examples are discussed later in this report).

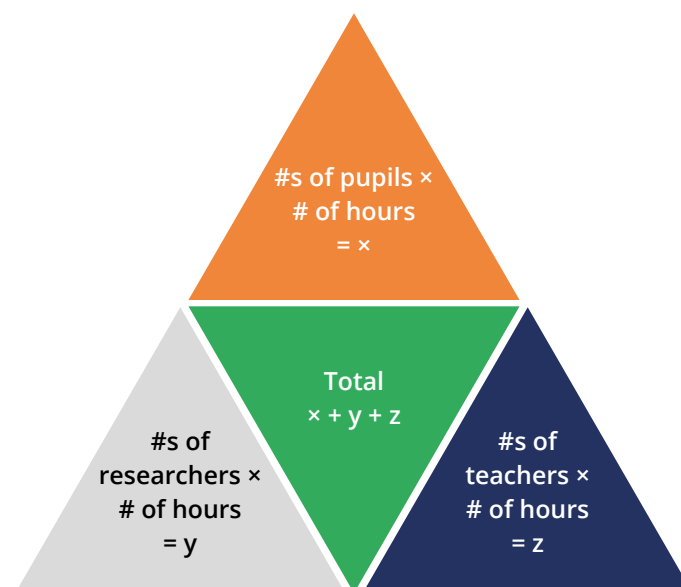


Figure 3: The formula for the 'SUPI metric' (Holliman and Davies, 2015).

Learning points

Culture change is still needed to raise the value of school-university engagement with research

Institutional and professional cultures can be resistant to the prospect of fully embedding school-university engagement with research in a structured, strategic and sustainable manner. There are a number of reasons for this, including:

1. Confusion about the purposes of school-university engagement with research. We argue that at least three strategic purposes can be identified for SUPI:
 - a. The recruitment of future university students. This activity dominates school-university engagement work, but is often related to teaching, not research.
 - b. A wider 'public service' remit where students and teachers are 'informed, educated and entertained'. We note that certain activities under this purpose have the potential to extend the public service remit to also engage, e.g. some forms of citizen enquiry.
 - c. To improve the quality and impacts from research, e.g. through the enactment of pathways to impact planning.
2. Following on from Point 1, we encountered a pre-existing academic culture where SUPI work is still seen as a 'duty', often acknowledged for being admirable in its default purpose (to recruit future students), but lacking in widely-recognised measures of esteem, not least when compared to other measures of research excellence (i.e. external funding and publications). Part of our rationale in adopting an action research-informed approach was to challenge this existing culture through the publication of our findings. (Further, members of our SUPI have contributed to the introduction of an open access journal, *Research for All: Advancing Public Engagement with Research*, where the findings from school-university engagement with research can be published.)

Too often the recruitment of future university students becomes the default purpose for school-university activities (Jensen and Holliman, 2016). The result is often that the potential to directly engage children and young people with research can be lost. It follows that the lack of clarity around the purposes for school-university engagement *with research* has resulted in a culture of confusion and ultimately a lack of progress in this field.



Research for All; IoE Press and the NCCPE.

With this point in mind, we note that in Year 2 of our SUPI we tried to recruit an (equivalent to) Project Coordinator (PC) at the OU to match the PC role based at the DTSA. We were unsuccessful for two reasons: a. we had no funding in place for this role; and b. even with our action research-informed approach researchers struggled to see how they could use the role to generate research outputs of sufficient quality to be entered into REF 2021.

3. Following from Points 1 and 2, we argue that SUPI work is still not routinely and consistently valued as 'core business'. To illustrate the point we received different answers to the question, "Is SUPI work?" from PhD supervisors and Line Managers. These actors are, broadly speaking, happy for SUPI activities to happen, but at a level that doesn't affect what they considered to be 'core business'. Further, we encountered a lack of obvious drivers to change this situation, not least because of the large number of competing priorities and a need to adapt to significant ongoing changes affecting the higher education sector *. Notably, we also failed to identify opportunities to bid for external funding at a level that could sustain the work of a SUPI beyond the four-years of part-funding provided by RCUK.
4. An important dialectical tension remains unresolved and may be unresolvable. Schools need to focus on curriculum requirements to meet the core needs of their audit culture (i.e. Ofsted inspections), whilst researchers are driven by a different but equally urgent audit culture based on the need to deliver evidence of impact directly connected with their research (e.g. REF Impact and Pathways to Impact requirements, but see also Point 1). The solution to this ongoing tension lies outside of the scope of our SUPI or the wider SUPI remit more generally.

The solutions to this broad set of challenges are neither obvious, nor guaranteed in their success. We argue that the restructuring of RCUK offers an opportunity to explore these issues in more detail and to propose a coherent sector-wide strategy for school-university engagement with research.

* The OU's Widening Participation agenda is framed differently to those in campus-based universities. Our core student demographic, for example, is adult learners, not school leavers. Furthermore, much of our WP commitment is at a 'national' (one country, four component 'devolved' nations), not local level.

Communication for partnership working

Clear and regular communication between the core members of our SUPI team has been essential to the success of the project. Locating and scheduling meetings can be a challenge, particularly when team members are working part-time on SUPI from different base locations, but this is also essential for partnership working. To this end, we scheduled routine meetings out of school hours, as far as possible during term time, hosted in different locations (when possible), and organised visiting status and 'hot desking' arrangements.

Intellectual Property Rights

In co-developing the partnership agreement (in the form of a contract) between the OU and the DTSA, issues of intellectual property were raised by the OU's Contract and Legal Services team. Our solution was to agree that all parties (OU, DTSA, students) would retain ownership of any intellectual property they produced, but that by participating in the project they would also agree to license these 'products', etc. under a [Creative Commons](#) license (or similar scheme) to promote sharing and re-use. In our experience, this solution has worked well. We note that, as a result of this policy and agreement, this report is published under a [Creative Commons](#) license; see the back cover for details.

Facilitating direct engagement with authentic forms of research

We identified two new ways (to our SUPI) of successfully facilitating 'direct' engagement between researchers and school students:

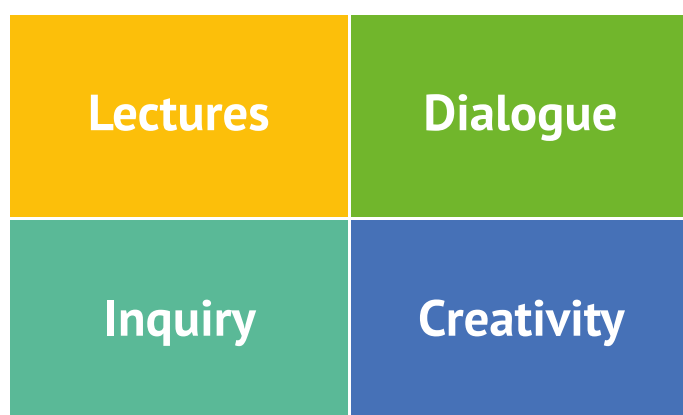
1. Working with teachers to support students studying for the Extended Project Qualification;
2. The 'Labcast', where direct engagement with cutting edge research can be facilitated ([Holliman et al., 2017](#)).

Both are discussed in more detail in the next section.

Engagement activities developed during our SUPI project

A flexible and adaptable framework for organising school-university engagement with research

To address the diversity in the academic disciplines where OU researchers are working, and the subjects that school students are taught across the DTSA, we successfully deployed a flexible and adaptable framework involving four types of activities: Open Lectures; Open Dialogues, Open Inquiry; and Open Creativity. Operationally, we found this framework to be useful when we planned for, delivered and evaluated our SUPI activities. We argue that the types of activity we have identified could be used more generally by any organisation seeking to develop school-university engagement with research.



Below we list the numbers of people engaged through our four types of activity, listed by year (Table 1). We then describe key activities for each of the four types of activity.

Open Lectures

We developed and delivered an Open Lecture programme in partnership with the DTSA, evaluating a sub-set of the lectures. The programme initially consisted of monthly lectures delivered at Denbigh School, combined with an annual seasonal lecture (described in more detail below). Based in part on the success of the Open Lecture programme, St. Paul's Catholic School then introduced a further programme of 'Public Understanding of Science' Lectures.

The core aims of the Open Lectures programme were to:

- » inspire young people to consider a range of careers in research;
- » raise awareness of different types of academic research;
- » promote authentic role models of successful researchers;
- » generate awareness of the nature and challenges of contemporary research.

Starting in September 2013, and running over four years until July 2017, our programme involved lectures and lecture demonstrations, aimed at pupils studying Key Stages 3, 4 and 5. More than 50% of the lectures were delivered by Open University researchers from a range of academic

Table 1: The numbers of people engaged through our four types of activity, listed by year.

	Lectures	Dialogues	Inquiry	Creativity	Total by year
Year 1 (2013)	650	17	41	42	750
Year 2 (2014)	1069	91	142	36	1338
Year 3 (2015)	1787	70	727	116	2700
Year 4 (2016)	1239	104	413	33	1789
Participation by activity type	4745	282	1323	227	Grand total 6577

fields. Our aim was for OU researchers to deliver at least 24 lectures to 2400 attendees. OU lectures delivered 54 lectures directly to 4745 attendees.

STEM Matters Lectures: (formerly Science Matters Lectures): We ran a series of seasonal lectures at the OU's campus in each of the four years of our SUPI partnership.

Presented in the Berrill Lecture Theatre, and as a live webcast (working with the OU's Audio Visual Team), we offered four 10 minute lectures per programme (16 lectures in total over the four years). The lectures were recorded and archived on the OU's [Engaging Research blog](#). Our approach to organising the lectures was published as an NCCPE Case Study: [Science Matters Open Lecture Programme](#).

In Year 1 of our SUPI we developed an inclusive 'formula' for putting together a programme of lectures ([Holliman, 2014](#); Figure 4). Feedback from these (and subsequent lectures) indicated this was successful so we kept it in place.

What we wanted to do was illustrate different aspects of the sciences, also technology, engineering and mathematics. In selecting the lecturers we also looked to illustrate diversity in disciplinary backgrounds and the ways that STEM researchers conduct their work. Similarly, we wanted to demonstrate different types of career where scientific training plays a central role, involving research, teaching, communication and engagement. And finally, we wanted to illustrate the different stages in a scientific career (from postgraduate research through to Professorial grade), and that these choices were equally open to women and men.



Figure 4: The 2013 Science Matters Lecture Team: Back-row, l-r Janet Goss, Diane Ford, Gareth Davies, Andrew Norton, Janice Ansine, Simon Kelley and Tim Blackman; front-row, Frazer Bird, Clare Warren and Richard Holliman.
Photo: Kate Bradshaw.



Figure 5: Dr Ellie Dommett discussing 'smart drugs' with KS 5 students, Denbigh School. Photo: Richard Holliman.

Open Dialogues

We aimed to deliver an Open Dialogues programme, drawing on established methodologies and methods developed in successful initiatives that promote discussion, interaction and deliberation (Grand and Dommett, 2015). We wanted to give young people structured opportunities to explore the social, economic and ethical dimensions of contemporary research (Figure 5).

The aims of this programme were to:

- » raise awareness of different types of academic research and the range of roles that researchers play within project teams and over the lifetime of an academic career;
- » develop skills and competencies that empower citizenship;
- » generate awareness of the nature and challenges of contemporary research; and
- » introduce discussion about the social, economic and ethical impacts of research.

We wanted to encourage young people to take control of the planning and delivery of these dialogues, running 64 events in 12 schools with 960 participants. Despite considerable effort on the part of Mark Russell as the DTSA-based Project Coordinator and OU researchers (in particular Gareth Davies, Ellie Dommett and Ann Grand), e.g. through promotional materials, workshops, and the production of a “How to...” guide and a video, we failed to meet our proposed target.

Overall, we connected with 282 participants through our Open Dialogue programme, indicating that our initial estimate was too ambitious. In practice, we found that OU researchers were often encountering dialogic formats for the first time. We also struggled to generate the necessary buy-in from Senior Leadership Teams in a wide enough range of local schools, in part because the aims of our programme overlapped with those of existing activities. In effect, we argue that our proposed programme of research cafés was a solution looking for a problem. Further, we found that KS5 students, who we were hoping to support in organising the cafés, also had multiple, pre-existing priorities. Taking on the organisation of these events was not seen as an aspirational and rewarding activity.

Open Inquiry

We developed and delivered a diverse Open Inquiry programme, involving pupils from Key Stages 3, 4 and 5. This included a wide range of research-based activities, a sub-set of which we evaluated. Our aim was to deliver inquiry-based activities to 312 students. In contrast to the challenges we faced in develop our programme of Open Dialogues, we delivered our Open Inquiry programme to 1,323 people, more than 1,000 beyond our target. Part of the reason for this was the enthusiasm for inquiry-based activities shown by OU researchers, which was closely matched by Senior Leadership Teams in local schools.

The core objectives of the Open Inquiry programme were to:

- » inspire young people to consider a range of careers in research and raise ambition to succeed in these ends;
- » raise awareness of different types of academic research; and
- » generate awareness of the nature and challenges of contemporary research.

Over the course of our SUPI, we made connections with existing schemes, including the [Nuffield Research Bursaries](#) (e.g. [Patel, 2015](#); [Mundy, 2014](#)). We also responded to the needs of local schools, for example, through our work in support of the Extended Project Qualification, contributed to funding applications, such as the Enigma Maths Hub, and developed new partnerships, including with the [Brilliant Club](#) (e.g. [Forbes, 2013](#)). Examples of activities developed and delivered through our Open Inquiry programme are listed below.



Figure 6: The 2013 Water Rocket Competition. Denbigh School students prepare a rocket for launch. Photo: Mark Russell.

Water Rocket Competition: Drawing on learning from a previous [Wellcome Trust-funded project](#) we ran a BBC [Rough Science](#)-inspired ‘Water Rocket’ Competition in each of the four years of our SUPI partnership. Hosted at Denbigh School each competition invited up to six teams of Year 9-10 students from schools to design and launch water rockets using scientific principles (Figure 6).

The students adapted their designs incrementally based on data collected from each test launch. From this they were asked to design and build two water rockets, one to fly the furthest horizontal distance, the other to hit a target.

The teams were guided by local teachers and Open University researchers, including researchers from the School of Physical Sciences. For more details about the 2016 competition, see: [Milton Keynes students are out of this world](#).



Figure 7: Denbigh School Media Students interviewing EPQ students from Lord Grey School. Photo: Richard Holliman.



Figure 8: Dr Simon Sheridan (OU) and Jenny Hallam (DTSA) delivering the 'labcast'.
Photo: Vic Pearson.

Extended Project Qualification: Collaborative working involving teachers and researchers allowed us to identify complementary needs in Years 3 and 4 of our SUPI.

We found that Heads of Sixth Form were looking for additional support for KS 5 pupils undertaking the Extended Project Qualification (EPQ).

We addressed these complementary needs by working together to provide supplementary support for the EPQ to more than 480 Key Stage 5 students from 12 schools in Milton Keynes (Figure 7).

We worked closely with a number of teachers, notably Joe Kendall (Oakgrove School), Penny Green (Lord Grey School) and Damien Sharp (St. Paul's Catholic School), whilst supporting hundreds of students as they explore the research cycle, developing, investigating and reporting the findings from their studies.



Figure 9: Concepts relevant to understanding resilience in Mathematics.

In our experience, support for the EPQ requires flexibility on the part of the researcher, a willingness to go beyond their research topic to support KS5 students who select their own topics to investigate. When recruiting researchers to these roles we made arguments that they would develop skills and gain experience of teaching in classroom settings.

For more details of our approach, see [Empowering lifelong citizenship](#) (see later sections for Educational Resources to support this activity).

Labcast: OU researchers and teachers from Denbigh School developed and delivered a 1-hour physics lesson to an A-level class of 25 Denbigh School students from a laboratory at the Open University's campus (Figure 8).

The Labcast allowed cutting edge research—involving an ESA-funded Rosetta Mission scientist who had been involved in the design and build of the OU's Ptolemy instrument on-board Rosetta's Philae lander—to be beamed directly into a local school.

Through this activity both the teacher and researcher also developed additional skills and expertise ([Holliman et al., 2017](#); [Pearson, 2016](#)).

Enigma Maths Hub—promoting resilience:

During the academic year 2015-16, Dr Clare Lee, an expert from the Open University in Mathematics resilience, worked with a group of 22 teachers from 12 different schools (primary and secondary) across the [Enigma Maths Hub](#) (Figure 9).

The purpose of the programme was to support teachers in applying some of the ideas from research about Maths resilience to their practice and therefore to improve the classroom experiences of children learning Maths. For further details about this activity, see [Lee, 2016](#).

Open Creativity

Through our Open Creativity programme we delivered a series of activities to support the development of transferable skills in communication, creativity, design, and media literacy. Our aim was to deliver creative activities to 200 students. We delivered our Open Creativity programme to 227 people.

The core aims of the Open Creativity programme were to:

- » raise awareness of different types of academic research;
- » develop skills and competencies that empower citizenship and facilitate media literacy, offering opportunities to participate in activities that improve skills and competencies in accessing, assessing, analysing and responding to aspects of contemporary research;
- » build confidence and self-efficacy among students from a diversity of backgrounds and abilities.

Media training: We ran five media training courses over the four years of our SUPI, each with 10 KS 5 students (Figure 10).

The training was led by experienced media professionals, working with teachers from local schools and OU researchers.

Over the five days of the courses students developed and practised new skills, such as working with digital tools and technologies, producing pieces to camera, and editing footage. The films, which cover topics as diverse as space science, the representation of scientists in popular media, educational technology, how to run a research café and studying for the EPQ, are listed later in this report.

Imagining Scientists: We delivered a one-day workshop with 30 Year 7 students from Denbigh School in Milton Keynes, exploring stereotypes of scientists. The activity was based on a previous research project called *Invisible Witnesses*. Students were given opportunities to develop skills in media literacy, e.g. by assessing stereotypical images of scientists in popular



Figure 10: Media Training, December 2016: l-r, Pippa Jennings (Teacher), Year 12 Students from Denbigh School, Gerard Giorgi-Coll (Editor), Dr Janet Sumner (Executive Producer) and Kerry Reid (Assistant Producer and Postgraduate Research Student). Photo: Richard Holliman.



Figure 11: Peter Devine facilitating the design activity with Denbigh students, Trevor Collins and Richard Holliman. Photo: Mark Russell.

media, then producing ideas for television programmes that promote STEM subjects in ways that are meaningful to audiences from different backgrounds. We also produced a teaching pack to allow teachers in other schools to run this activity, along with two videos produced by sixth-formers (Whitelegg et al., 2014).

Design activity: We developed a series of six linked, collaborative interventions, working with school students from Milton Keynes and Open University researchers. Our aim was to co-design artefacts that would represent our SUPI project (Figure 11).

The students designed wristbands to represent desirable attributes they wanted to see during school-university engagement activities. They called for researchers to be positive, inquisitive, imaginative and creative, a far cry from narrow framings of school-university engagement as a recruitment activity.

This activity has been promoted as a 'best practice' case study by the National Coordinating Centre for Public Engagement (Collins et al., 2015; see Figure 12).



Figure 12: We asked students what attributes they wanted to see in university researchers visiting their school. They responded: be positive, inquisitive imaginative and creative (Collins et al., 2015). Photo: Mark Russell.

The impact and influence of our SUPI project

Influencing policy and professional practice

What are the purposes of school-university engagement with research? We outlined a shared vision for our SUPI when we put our proposal together, a vision where young people are seen as key ‘publics’ for public engagement with research activity. Students and teachers, in particular, appeared to share this vision.

This vision, made manifest through our strategic planning and operational practices and encapsulated in blog posts (e.g. [Holliman, 2016; 2014](#)), required an ongoing commitment to diversity and inclusion, conceptualising students as prospective citizens with a stake in how research agendas are framed and prioritised.

We have found that this vision can be in conflict at times with political agendas, institutional imperatives, funding priorities, and the professional practices of some researchers (e.g. [Jensen and Holliman, 2016](#)). We have worked through our SUPI to address these ongoing challenges, principally though work with funders and the NCCPE (e.g. [NCCPE, 2017](#)), but also through training and support (e.g. [Holliman and Warren, 2017](#)), and the sharing of our action research-

informed findings (e.g. [Holliman et al., 2017](#)). Further, our SUPI has offered OU researchers opportunities to learn from teachers and students working in local schools, and to generate evidence of social and economic impacts from research (Figure 12).

Is this still a problem? A recent example further illustrates the challenge we continue to face as reflective practitioners in this field. “Your local university needs you!” could have been the headline on the recent [Guardian](#) article about the RCUK-funded School-University Partnership Initiative (SUPI).

There is much to commend in the article and in the activities fellow SUPIs have developed, delivered and assessed over the previous four years. However, we argue that framing the diversity of SUPI approaches and purposes so narrowly, as if university researchers are the recruiting sergeants for their institutions, does not do our work or the more diverse purposes of this RCUK-funded initiative justice.

We argue that the call to recruit rather than engage, too often becomes the default purpose for school-university engagement with research. The vision for school-university engagement with research requires a clear and consistent message that goes beyond the limited rationale of “putting bottoms on the seats of the lecture halls of the future” if we are to do justice to the broader agenda that RCUK originally envisioned for SUPI.

To this end, members of our SUPI have worked with public funders for research, the NCCPE and other SUPIs (e.g. [Collins et al., 2017](#)) throughout our four-year project, to promote a broad agenda for school-university engagement with research. Key highlights include: sharing our learning with [STFC](#) and [NERC](#) as they produced fresh strategies for public engagement, support for an STFC Working Group that explored the [attitudes, culture and ethos](#) of physical science researchers in relation to public engagement, written evidence submitted to the House of Commons Select Committee [Inquiry on Science Communication](#), and to the HEFCE Consultation about REF 2021 ([Holliman, 2017](#)).



Lessons learned from the RCUK-funded SUPIs (NCCPE, 2017).

Holliman has continued to promote the principles and reflective practices of our SUPI following the completion of the RCUK-funded phase of our partnership with the DTSA, e.g. through his role on STFC's [Advisory Panel for Public Engagement](#), and through the RCUK Public Engagement with Research strategy refresh.

Changes, benefits and/or effects to public engagement with research

Table 1 provides an overview of the numbers of people we have engaged through our SUPI. This is broken down by types of activity, and listed by year. Overall, we have worked with 11 schools and engaged more than 6,577 people within Milton Keynes, surpassing our target of 3,800.

Reach vs. depth of engagement: We note that these data are skewed; far more people, >70%, engaged with our lecture programme when compared to the other three activities. It is therefore important to acknowledge the challenge of justifying reach (large numbers) against depth of engagement, noting that greater depth of

engagement is likely to produce more significant changes, effects and/or benefits to those engaging ([Holliman, 2017](#); [Holliman and Davies, 2015](#)).

A typical presentation in our Open Lecture programme involves around an hour-long commitment of time. Using our 'SUPI Metric' formula (Figure 3) this would equate to around 4745 hours of engaged time. In contrast, if we compare this figure with the total number of hours committed to one of the media training workshops (around 676 hours; (Figure 13) and then multiple this by the number of workshops we ran ($n=5$), the overall figure is around 3380 hours of engaged time, but with 50 students.

We argue that in-depth activities have the greatest chance of increasing self-efficacy of students in how they interact with researchers and respond to contemporary research in meaningful ways. This requires that research funders have consistent and equitable measures to judge value-for-money in how researchers plan pathways to research impact involving school-university engagement with research.

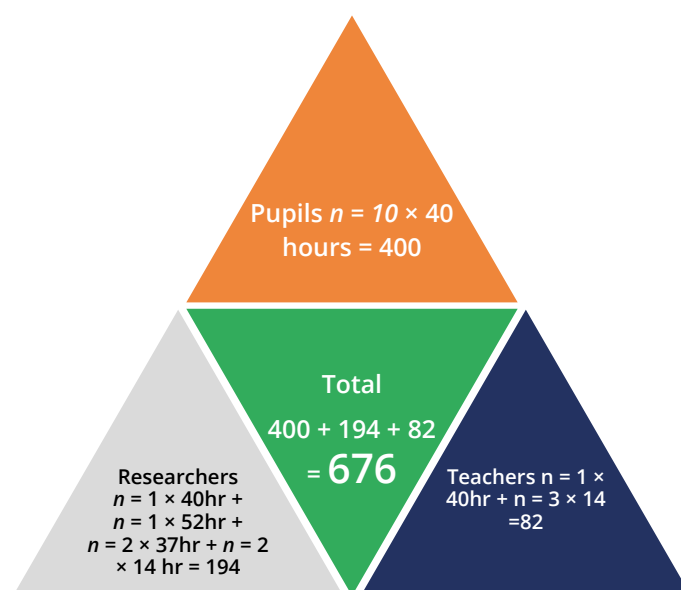


Figure 13: The 'SUPI Metric' calculations for a media training workshop.

Holistic planning and evaluation

Our SUPI proposed an action research-informed approach, evaluating a sub-set of our activities. We have developed, tested and refined an approach based on holistic planning for school-university engagement with research where evaluation is incorporated from the start. To illustrate this approach we offer extracts from a fully worked example, using the Labcast, one of our Open Inquiry activities (Holliman et al., 2017). Throughout this activity we collected evaluation evidence of performance from the pupils, teacher and researcher.

Figure 14 summarises our evaluation strategy, identifying pre-and post-Labcast measures of the teacher's, researcher's and students' experiences.

Our goals were to evaluate the challenges and impacts of giving students an authentic experience of engaging with research scientist in their laboratory; providing the opportunity to engage with cutting-edge science within the curriculum; and providing development opportunities for teachers and researchers.

In total there were seven OU staff (including a project coordinator, technical staff and a research scientist); five teachers (an early career physics teacher in the Open University laboratory, and a senior leader, the Project Coordinator, and two teachers supported at the school); and 25 students (all of whom were in Year 12 studying A-level Physics at the time of the Labcast). Using our 'SUPI Metric' formula (Figure 15) the Labcast equates to around 273 hours of engaged time, much of which involved OU researchers and teachers.

The Labcast was designed to offer students an authentic experience of research by engaging them via a webcast with a professional scientist from a research laboratory in the university. The format

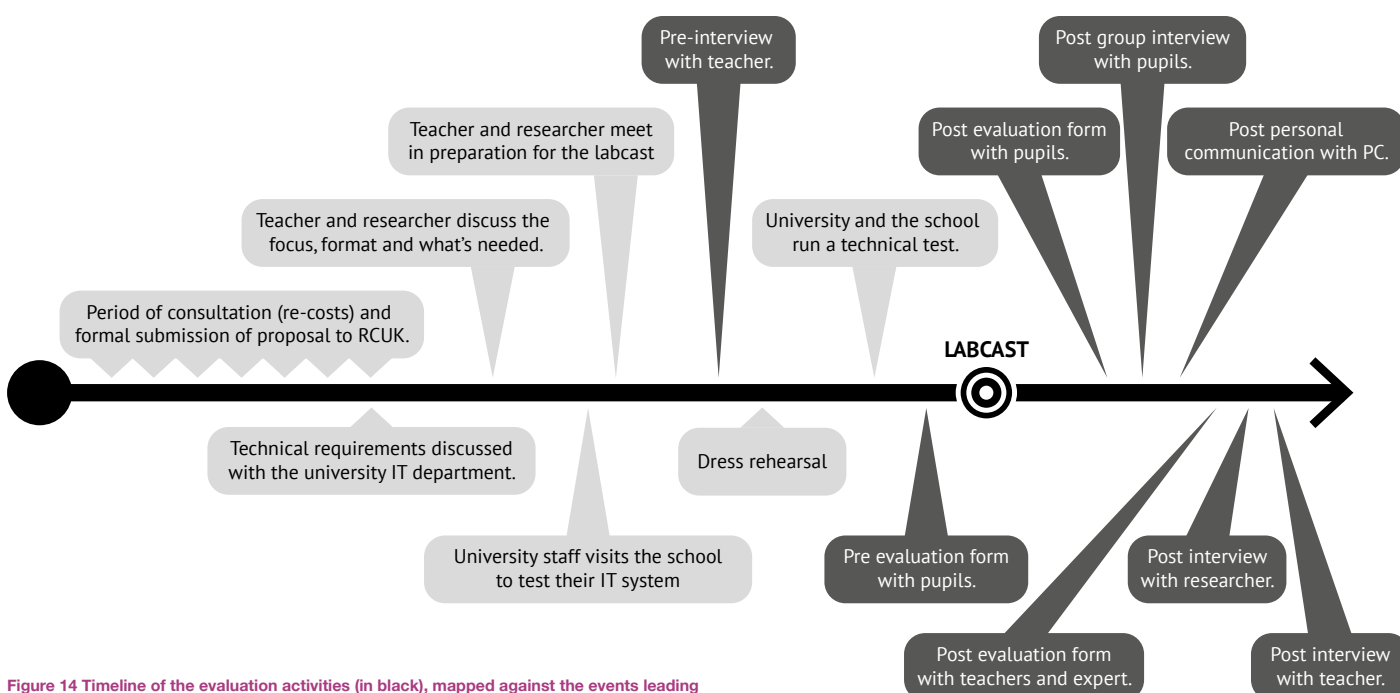


Figure 14 Timeline of the evaluation activities (in black), mapped against the events leading up to a Labcast activity (in grey). (PC = Project Coordinator).

was designed demonstrate how equations taught at A-level Physics had been used to calculate the landing of the *Philae lander* on a Comet (67P/Churyumov-Gerasimenko); hence, bridging the divide between theory and practice.

For the purposes of evaluation we chose to focus our efforts on gathering insights from the physics teacher, the research scientist, and the students. By carrying out pre- and post-interviews with the physics teacher we learnt that, from their perspective, the Labcast had met the key objectives. It helped them move beyond the “very theoretical” to the more practical and tangible understanding of “a real life research situation” (Holliman et al., 2017, p. 99).

From pre-and post-evaluation forms and a post-group interview with the students we learnt that from their perspective the Labcast had also met the key objectives, “*The amount we learnt in the labcast I would say would normally take us about three lessons*”. Moreover, the teacher explained that the students will have benefited by getting, “*to see behind the scenes [...] [and] some of the real difficulties which are in planning an actual science mission*”. The teacher explained that the students also got to experience a “*lightbulb moment*” when they understood that the researcher was “*just like anyone else*”, and it increased the students’ awareness of the large time frames and costs characterizing contemporary research (Holliman et al., 2017, p. 100).

One of the objectives of the activity was to give the teacher opportunities to update their knowledge; empowering them

to encourage students to explore scientific developments and associated social and economic issues. This resulted in students’ understanding of the opportunities that were available to them. For others, it helped them to understand the role they could play in science.

The planning and hosting of the Labcast was intended to provide development opportunities for the teacher and researcher. From the teacher’s perspective we learnt that this was achieved in the planning stage by demonstrating the ability to incorporate factors such as “*action learning*” into the lesson plan. Having taken part in the Labcast, the teacher said the experience of engaging with the contemporary research and researcher was valuable in itself because it gave them ideas about how they might improve their style of teaching (Holliman et al., 2017).

In summary, we argue from an action research perspective that evaluation should inform critical reflection and changes in practice (Holliman et al., 2017). From the evaluation we learnt a number of lessons to consider before planning future Labcasts. The planning phase was crucial. The teacher and researcher went through a process of having to redefine their preconceived idea of what

role they would play and what they hoped to gain from their experience. We also learnt that students didn’t really know what to expect. Better information prior to the Labcast could help with this in future. Pragmatically, we experienced a tension between quality and informality and authenticity, for example, in deciding to have ‘messy’ laboratory versus a studio set up.

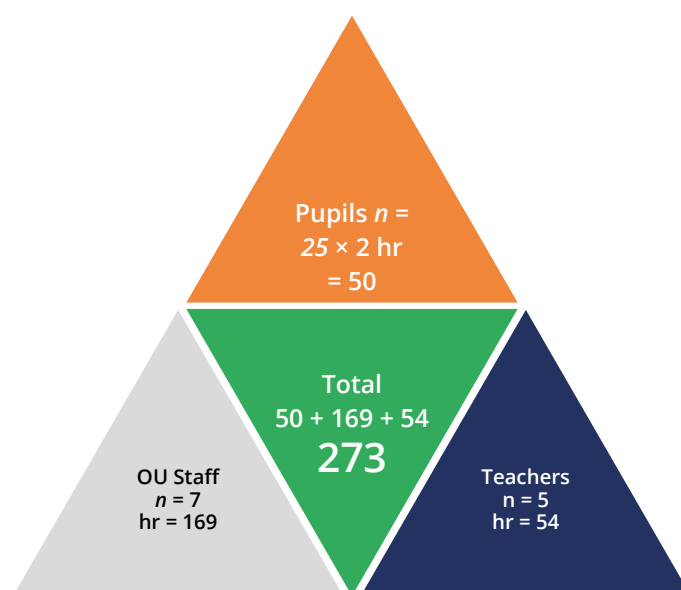


Figure 15: The SUPI metric calculation for the Labcast activity.

The influence of our SUPI project on the key partners

Denbigh Teaching School Alliance



Helen Brown, Director of the Denbigh Teaching School Alliance.

From the perspective of the DTSA, the SUPI project has proven to be an incredibly rich source of opportunity for both teacher and student alike (Brown, 2016; Squires, 2014). The variety of projects have enabled a diverse group of students from across the schools in

Milton Keynes to develop their learning beyond the confines of a classroom and course syllabus. The SUPI projects have helped to inspire a thirst for engagement amongst students and teachers and provided them with experiences that will stay with them beyond full time education. As an example, students attending the Brilliant Club activity said that, whilst their experience had reaffirmed their aspirations and reassured them that they were on the right pathway, it had also opened their eyes to research and the interest this had given them for studying the sciences.

Through the SUPI projects teaching staff at schools across Milton Keynes have been able to work cooperatively and collaboratively with academics from a range of disciplines, enabling them to update and to develop their own subject knowledge, and use this to enrich the lessons that they deliver to students. As an example, teachers who accompanied Denbigh School students to the Science Matters lectures in 2015 expressed an interest in developing their own external links with the academic community.

Another short term, and potentially longer term, impact of our SUPI partnership is with regards to supporting schools in their participation in trips and

educational projects. Discovering and developing external links for projects and visits is becoming increasingly difficult in a climate where shrinking school budgets means that such trips and projects must provide demonstrable value for money. Our SUPI project has provided a range of cost effective opportunities within a culture of city-wide collaboration. With this in mind we note that, of the schools that took part in activities such as STEM Lectures or Research Cafés, the schools often opted to take part in further activities.

Overall, our SUPI partnership has given schools across Milton Keynes structured opportunities to access the expertise of academics and has served to develop links and partnerships that will last beyond the life span of this project. To this end, the DTSA worked with our OU SUPI colleagues to develop a Memorandum of Understanding (MoU), which we would be delighted to sign so that we have a strategic base from which to continue our work in the future.

The Open University



Professor Richard Holliman, The Open University.

A key focus of our work in Year 4 has been to secure a strategic commitment for sustaining the OU's contribution to our SUPI work beyond 2016. We have addressed this challenge by taking

the widest possible view of school-university engagement (with research), collaboratively developing a MoU for discussion across different OU units. As a result, our Faculty of Well-being Education and Language Studies have agreed to sign-up to the MoU, in a clear commitment to work

with school teachers on research in the School of Education, Youth, Childhood and Sport. We are still in discussion with other OU Faculties, notably in the Faculty of Science, Technology, Engineering and Mathematics where we have proposed a strategy for engaged research, covering a range of strategic external activity, including SUPI. **OpenTEL**,* a recently identified priority research area for the University, is working with the ideas emerging from SUPI to develop a vision of open engaged research. Further, we are continuing discussions with our Office of Research and Academic Strategy, with a view to securing a strategy and ongoing leadership role for SUPI at the OU. To this end, the Open University has recently appointed an Academic Lead for Engaged Research (**Holliman, 2017**), and we are in the process of recruiting an Academic Lead for School-University Engagement. Notably, we also recently secured funding to offer intense, residential-based training for up to 30 environmental scientists, and we are in discussion with our Graduate School to develop an OU-wide programme of training and support.

matches that identified recently by STFC's **PEACE Report** (see also **Holliman, 2016**).

There is work still to be done if we are to catalyse change within the OU and more widely across the HE sector and schools to embed a sustainable, strategically-informed culture of reflective practice, creating the conditions where the UK will become internationally recognised for excellence in school-university engagement with research. We argue that through our SUPI work we have contributed significant leadership to influence the changes required in how school-university engagement with research is conceptualised, both at the OU and more widely, how it is funded and in what counts as excellence.



The STFC PEACE Report.

We also note work in the School of Physical Sciences (SPS), which has a long-standing, embedded and commendable commitment to widening participation in the physical sciences. This emphasis on widening participation in SPS reflects wider,

long-standing concerns about: 1.) the uptake of qualifications in the physical sciences; and 2.) specific issues about girls and women studying the physical sciences at tertiary level. The result is that **school-university “outreach”** (i.e., not necessarily direct engagement with research) is embedded in SPS, e.g. through teaching initiatives with the **Ogden Trust** and membership of **SEPnet** and other ‘public service’ activities. This context for school-university engagement (with research) broadly

* OpenTEL stands for Open Technology-Enhanced Learning.

Publications and Products

We have consolidated and shared the learning from our SUPI through a sophisticated and coordinated communication strategy involving publications, conference papers and posters, workshops, pamphlets, blog posts and via social media. Wherever possible we have made our publications and products available under licences that promote sharing and re-use.

Publications

Holliman, R., Davies, G., Pearson, V., Collins, T., Sheridan, S., Brown, H., Hallam, J. and Russell, M. (2017). 'Planning for engaged research: a collaborative 'Labcast'', in Kucirkova, N. and Oliver Quinlan, O. (eds.) *The Digitally Agile Researcher*. Open University Press, Maidenhead. Available from: <http://oro.open.ac.uk/50411>

Holliman, R. and Warren, C.J. (2017). 'Supporting future scholars of engaged research', *Research for All: Universities and Society*, 1(1), pp. 168-184. Available from: <http://oro.open.ac.uk/48223>

Holliman, Richard (2017). Supporting excellence in engaged research. *Journal of Science Communication*, 16(5) pp. 1-10. Available from: <http://oro.open.ac.uk/52439>

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Presentations

Collins, T., Bryan, S., Cripps, E., Davies, G., Houghton, A.M., Russell, M., Spurrell, J. and Taylor, J. (2016). 'The Dragons' Den of School Partnership Sustainability'. Workshop at the NCCPE Engage Conference 'Inspiring Innovation'; Bristol, United Kingdom, 29-30 November.

Davies, G. (2016). 'Do It Yourself Wireless Networking for Location-based Collective Awareness'. Presentation at the NCCPE Engage Conference 'Inspiring Innovation'; Bristol, United Kingdom, 29-30 November.

Dohaney, J., Medvecky, F., Priestley, R., Holliman, R., Brogt, E., Galloway, C., Herbulock, D. and Knapen, M. (2016). 'Science communication education and training: How are we preparing the next generation of science communicators?' Science Communicators Association of New Zealand (SCANZ) Annual Conference. Otago Museum, Dunedin, New Zealand, 14-16 November.

Collins, T., Pearson, V., Davies, G., Sheridan, S., Holliman, R., Brown, H., Russell, M., Hallam, J. and Steed, A. (2016). 'Using Live Video Conferencing to Enable Authentic School-University Engagement'. Presentation at Science in Public, 2016; University of Kent, Canterbury, 13-16 July.

Collins, T., Pearson, V., Davies, G., Sheridan, S., Holliman, R., Brown, H., Russell, M. and Hallam, J. (2016). 'Labcasts: Bringing cutting edge science into the classroom'. Poster presented in the 14th International Public Communication of Science and Technology Conference: 'Science communication in a digital age'; Istanbul, Turkey, 26-28 April.

Holliman, R. (2014). 'Engaging research: connecting theory and practice', Engaged Practice Learning Exchange, National Coordinating Centre for Public Engagement, Marriott Royal Hotel, Bristol, 2 December.

Holliman, R., Davies, G., Sumner, J., Squires, A., Brown, H. and E. Scanlon (2014). 'Engaging opportunities: Developing a school-university partnership to connect young people and teachers with researchers.' Presented at the 13th International Public Communication of Science and Technology Conference: 'Science communication for social inclusion and political engagement'; Salvador (Bahia), Brazil, 5-8 May.

Workshops and Events (not discussed elsewhere in this report)

Steed, A. and Holliman, R. (2017). 'Engaging opportunities: connecting young people and teachers with researchers', Denbigh School Governor's Meeting, 14 June.

Holliman, R. (2016). 'Assessing excellence in educational research.' Denbigh Teaching School Alliance Teach Meet, Denbigh School, Milton Keynes, 28 June.

Holliman, R. and Davies, G. (2015). 'Can we move beyond the seductive siren of reach?' SUPI Coordination Meeting, National Coordinating Centre for Public Engagement, NCVO, London, 16 June.

Davies, G. and Holliman, R. (2014). 'A strategic approach for evaluating public engagement with research'. Engaging Research Seminar, KMi Podium, The Open University, Milton Keynes, 14 July. Available from: <http://www.open.ac.uk/blogs/per/?p=4018>

Holliman, R. (2013). 'Engaging Opportunities'. Contribution to an NCCPE/SUPI Lunchtime Seminar at RCUK Headquarters, Swindon, 19 November.

Holliman, R. (2013). 'Engaging opportunities: connecting young people with contemporary research and researchers', presented to the meeting of Deans, Associate Deans Research and Research Centre Directors, Walton Hall, The Open University, Milton Keynes, 25 April.

Holliman, R. (2013). 'Engaging Opportunities: a hive of activity', presented at the NCCPE-hosted, SUPI Launch Meeting, Woburn House Conference Centre, London, 25 June.

Project Reports

National Co-ordinating Centre for Public Engagement (NCCPE) (2017). School-University Partnerships: Lessons from the RCUK-funded School-University Partnership Initiative. Bristol: NCCPE, https://www.publicengagement.ac.uk/sites/default/files/publication/nccpe_supi_lessons.pdf.

Holliman, R., Davies, G., Russell, M., Steed, A., Brown, H., Pearson, V., Ford, D., Collins, T., Scanlon, E., Sumner, J., Stutchbury, K., Lee, C., Ansine, J., Kendall, J., Green, P., Sharp, D., Whitelegg, E., Dommett, E., Bullivant, M., Squires, A., Braithwaite, N., Swinthenby, S. and Hawthorne, V. (2017). Final Report for "Engaging Opportunities". The Open University's School-University Partnership Initiative (SUPI). Produced for Research Council UK's Public Engagement with Research Network and the SUPI Advisory Board. Available from: http://www.open.ac.uk/blogs/per/?attachment_id=7680

Lee, C. (2016). Developing Mathematical Resilience: Teachers' reflections on working to develop mathematical resilience in learners. Enigma Mathematics Hub, Milton Keynes. Available from: <http://www.enigmamathshub.co.uk/copy-of-enigma-teaching-for-mastery>

Holliman, R., Davies, G., Steed, A., Pearson, V., Ford, D., Sumner, J., Stutchbury, K., Lee, C., Brown, H., Collins, T., Kendall, J., Green, P., Squires, A., and Braithwaite, N. (2017). Year 4 Report for “Engaging Opportunities”. The Open University’s School-University Partnership Initiative (SUPI). Produced for Research Council UK’s Public Engagement with Research Network and the SUPI Advisory Board. Available from: <http://www.open.ac.uk/blogs/per/?p=7416>

Davies, G., Holliman, R., and Steed, A. (2017). Year 4 Evaluation Framework for “Engaging Opportunities”. The Open University’s School-University Partnership Initiative (SUPI). Produced for Research Council UK’s Public Engagement with Research Network and the SUPI Advisory Board. Available from: <http://www.open.ac.uk/blogs/per/?p=7415>

Holliman, R., Davies, G., Russell, M., Steed, A., Pearson, V., Ford, D., Dommett, E., Brown, H., Collins, T., Squires, A. and Braithwaite, N. (2016). Third Year Report for “Engaging Opportunities”. The Open University’s School-University Partnership Initiative (SUPI). Produced for Research Council UK’s Public Engagement with Research Network and the SUPI Advisory Board. Available from: http://www.open.ac.uk/blogs/per/?attachment_id=6822

Davies, G., Holliman, R., Brown, H., Russell, M. and Steed, A. (2016). Year 3 Evaluation Framework for “Engaging Opportunities”. The Open University’s School-University Partnership Initiative (SUPI). Produced for Research Council UK’s Public Engagement with Research Network and the SUPI Advisory Board. Available from: http://www.open.ac.uk/blogs/per/?attachment_id=6823

Holliman, R., Davies, G., Russell, M. and Pearson, V. (2015). Second Year Report for “Engaging Opportunities”, including editing of one case study and editing on another; co-author of evaluation framework. The Open University’s School-University Partnership Initiative (SUPI). Produced for Research Council UK’s Public Engagement with Research Network and the SUPI Advisory Board.

Holliman, R. (2014). Second Year Report for “An open research university”, including editing of two case studies, The Open University’s Public Engagement with Research Catalyst. Produced for Research Council UK’s Public Engagement with Research Network.

Holliman, R. (2013). First Year Report for “Engaging Opportunities”, including authoring of two case studies, The Open University’s School-University Partnership Initiative (SUPI). Produced for Research Council UK’s Public Engagement with Research Network and the SUPI Advisory Board.

Blog Posts

We have authored or commissioned and edited 50 blog posts (approx. 1 per month over the lifetime of our SUPI). The authors include students, teachers, OU researchers and support staff, interns, and other members of the wider SUPI family. Several of the students and OU researchers produced their first ever blog post for our SUPI.

Holliman, R. (2017). ‘Engaged research as a route to epistemic justice’ Engaging Research Blog. 14 December. Available from: <http://www.open.ac.uk/blogs/per/?p=7813>

Holliman, R. (2017). ‘How can you plan effectively for engaged research?’ Engaging Research Blog. 7 December. Available from: <http://www.open.ac.uk/blogs/per/?p=7829>

Upton, M. (2017). ‘Managing My Money for Young Adults.’ Engaging Research Blog. 6 November. Available from: <http://www.open.ac.uk/blogs/per/?p=7776>

Smith, A. (2017). ‘Zero to hero – engaging teachers to teach network engineering.’ Engaging Research Blog. 25 October. Available from: <http://www.open.ac.uk/blogs/per/?p=7766>

Holliman, R. (2017). ‘Creative ways of working; a gift that keeps on giving.’ Engaging Research Blog. 20 September. Available from: <http://www.open.ac.uk/blogs/per/?p=7704>

- Holliman, R. (2017). 'Supporting Excellent in Engaged Research.' Engaging Research Blog. 1 August. Available from: <http://www.open.ac.uk/blogs/per/?p=7643>
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Educational Materials

We have produced a [dedicated web page](#) hosting resources relevant to school-university engagement with research.

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Videos

50 students from three schools and one college in Milton Keynes, researchers and support staff produced 19 short films about OU research and our SUPI. The films include contributions from students, teachers and OU researchers.

2016



Is the Extended Project Qualification for you?

This is a short film about the Extended Project Qualification. The film was produced by ten year 12 Denbigh School Students. The film features EPQ teacher Joe Kendall (Oakgrove School) and nine EPQ students from Oakgrove and Lord Grey Schools, respectively.

Available online: <https://youtu.be/H5IQLUuyCks>

2016

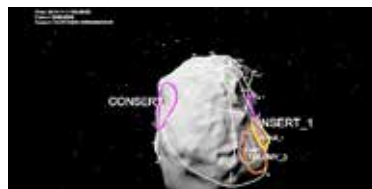


Is it a bug's life on Mars?

This is a short film about extremophiles and the parameters of life. The film was produced by ten year 12 Denbigh School Students. It features Penny Green (EPQ teacher), Warren Chinwadzimba (EPQ student) and Dr Karen Olsson-Francis (OU researcher).

Available online: <https://youtu.be/jv3InFGzJ1w>

2015



Labcasts: Interactive live web broadcasting

This is a short film about Labcasts. It was produced by Trevor Collins, a researcher from the OU's Knowledge Media Institute.

Available from: <https://youtu.be/HINfMcetNZ0>

2014



Rosetta: where science meets technology

This is a short film about the ESA-funded Rosetta Mission. The film was produced by five Walton High Students and features several OU researchers.

Available online: <http://youtu.be/tGDGzzIXbbU>



An APPetite for nQuire

This is a short film about the OU's nQuire Research Project. The film was produced by five MK College students and features an OU researcher and students who have used the nQuire citizen inquiry platform.

Available online: <http://youtu.be/1OI4IFPCjxw>

2014



nQuire: sound investigation

This is a short film about the OU's nQuire Research Project. The film was produced by five MK College students and features an OU researcher and students who have used the nQuire citizen inquiry platform.

Available online: <http://youtu.be/dMfwaWeM6dA>



Science: white coats and laboratories

This is a short film about the Invisible Witnesses Research Project. The film was produced by five Denbigh School Students and features OU researchers discussing research into gendered representations of scientists in popular culture.

Available online: <http://youtu.be/gXBtOUSWg0>



A novel approach to the life sciences

This is a short film about the Invisible Witnesses Research Project. The film was produced by five Denbigh School Students. The film features an OU researcher discussing research, and a teacher discussing curriculum resources, into gendered representations of scientists in popular culture.

Available online: <http://youtu.be/GjblQwloxbk>



Open University Postgraduate Internship Programme

This is a short film about the OU's Postgraduate Internship Programme (sponsored by Santander). The film was produced by the OU's Research, Scholarship and Quality Unit.

Available online: <https://youtu.be/ToliuVqz6OU>



Engaging opportunities: water rocket activity

This is a short film about the SUPI Water Rocket Competition. The film was produced by eight Denbigh School Students and features Mike Bullivant, an OU researcher. Brian White (RIP), the then Mayor of Milton Keynes is interviewed as one of the judges for the competition.

Available online: <http://youtu.be/vODUANsLaKw>



The Open University and the Brilliant Club

This is a short film about the OU's partnership with the Brilliant Club. The film was produced by the OU's Research, Scholarship and Quality Unit.

Available online: <https://youtu.be/IH5UQYUINrU>

2013



How to make a short film: some of the 'dos' and 'don'ts'

This is a short film providing advice and guidance to future Media Studies students. The film was produced by five Denbigh School Students, and features several of them as interviewees.

Available online: <http://youtu.be/CvEtv5faSu0>



Engaging opportunities: Reflections on media training

This is a short film reflecting on the first of our SUPI media training workshops. The film was produced by ten Denbigh School Students and features an OU researcher, teacher and several students.

Available online: http://youtu.be/0rnHFSq_G_Q



How to run a research café on 'smart drugs'

This is a short film describing how to run a research café. The film was produced by ten Denbigh School Students and features three OU researchers and several Denbigh School students.

Available online: http://youtu.be/19m_rFAhqPM



What's it like to study at Denbigh School in Milton Keynes?

This is a short film promoting Denbigh School. The film was produced by five Denbigh School Students and features interviews with a senior teacher and a student.

Available online: <http://youtu.be/2gzYhxFgYI8>

2013



Media Training - how do you make a video?

This is a short film exploring some of the more light-hearted aspects of producing short films. The film was produced by five Denbigh School Students.

Available online: <http://youtu.be/lnZ3fGUoMkY>



Media production: exploring animation and web video

This is a short film exploring animation and web video. The film was produced by five Denbigh School Students, and features several students and OU members of staff.

Available online: <http://youtu.be/ZgQ5MArkIus>



Skills and People



Figure 16: Supporting NERC-funded postgraduate researchers through the CENTA Doctoral Training Partnership. Photo: Gareth Davies.

Our skills-related development work has focused on the introduction of support mechanisms, professional development programmes and mentoring opportunities for academic researchers, teachers and students. As such, we have focused on three related areas identified by the NCCPE through their work with the Beacons for Public Engagement: Training, Support and Recognition (NCCPE, 2010), where relevant linking this with the [Public Engagement Lens](#) on the Research Development Framework.

Upstream planning: Our training activities have focussed mainly in the form of [planning for school-university engagement with research](#), with support offered in the planning for Pathways to Impact and other relevant funding opportunities (Figure 16). The learning from this work has been consolidated and shared in a number of forms, e.g. see [Holliman and Warren, 2017](#).

Sourcing credible information: How do children and young people search for, filter, analyse and respond to diverse sources of information in structured ways? Through our work on the Extended Project Qualification we have helped to support the development of information literacy skills for students and teachers.

Representing research: We have supported students, teachers and OU researchers as they take on media literacy skills in collecting, collating and reconstructing information for a range of different audiences. Further, members of our SUPI (teachers and researchers) have supported OU researchers through constructive criticism as they prepare for the annual STEM Lectures.

Project management and team working: We have supported OU researchers wishing to gain practical experience in the design and delivery of school-university engagement activities as part of a larger team. Further, although this wasn't put into action, we worked with KS5 students through our Open Dialogue programme to support the planning of research cafés.

Teaching: OU postgraduate researchers have few opportunities to gain skills in face-to-face teaching during the course of their studies. In working with the Brilliant Club these researchers have been trained deliver teaching in classroom settings.

Strategic planning: Members of our SUPI have mentored OU researchers as they develop strategic approaches to school-university engagement with research. This work is ongoing.

Career development and progression: We have offered training and mentored OU researchers to ensure that they collate information about their school-university work, recording, where relevant, skills and competencies gained in the process (e.g. see [Holliman and Warren, 2017](#)). Members of our SUPI also routinely mentor candidates for promotion and provide reviews and references for job applications and career progression.

Secondments placements and internships



Dr Leanne Gunn, Science Made Simple.

In Year 2 we mentored Leanne Gunn, at the time a postgraduate research student at the OU, to help support the preparation and delivery of the Water Rocket Activity ([Gunn, 2014](#)). Leanne had expressed a desire to move to become a professional science communicator, and

was looking for project management experience. Leanne now works for [Science Made Simple](#) (SMS) and recently opened a branch of SMS based at the OU's campus in Milton Keynes.



Jess Carr, The Open University.

In Year 2 we employed Jessica Carr as an intern to support three Media Training workshops and to deliver the Water Rocket Activity ([Carr, 2014](#)). Jessica subsequently went on to work for [Yellow Submarine](#), a charity dedicated to supporting young

people with learning difficulties to develop their social skills, confidence, independence and ultimately their employability. [Jessica](#) is now studying for a higher research degree at the OU, where she is investigating how people with learning

disabilities engage with citizen science initiatives.

Mairi Walker and Vincent Trott, both OU postgraduate researchers at the time, worked as Santander-sponsored interns at the Brilliant Club, an educational charity ([Walker and Trott, 2014](#)). The students helped to organise placements for other PGRs in schools. Mairi went on to work as a [Mathematics Engagement Officer](#) at the University of Edinburgh.

Awards, Recognition and Partnerships

We have seen changes in how OU researchers are recognised and rewarded for excellence in this area, notably following the introduction of [revised promotion criteria](#) and a Knowledge Exchange Profile. We note two examples where OU staff were promoted during the course of our SUPI, one to Professor, and one to Senior Lecturer. Both members of staff used evidence of working on SUPI in their successful cases.

Four members of our SUPI (three OU researchers, one DTSA teacher) were invited to act as judges on the OU's Engaging Research Award Schemes in [2014](#) and [2015](#). One member of the OU's SUPI team, an OU researcher, has acted as a judge on Cambridge University's 2015 [Public Engagement with Research](#) Award Scheme. The same member of the team acted as a judge on the NCCPE's Engage Competition in 2014 and 2016, on both occasions assessing entries to the school-university category.

The OU has been working with the [Brilliant Club](#) since 2013 to deliver training and opportunities for postgraduate researchers in classroom settings. OU researchers have also contributed to the [Enigma Maths Hub](#), both to the Strategy Board and through activities. Further, we have contributed to the NERC-funded [CENTA](#) Doctoral Training Partnership, and members of our SUPI team are contributing to a postgraduate research supervision involving [Yellow Submarine](#), a charity that supports young people with learning disabilities.

Representing Engaged Research

Afterword from Peter Devine



I've been representing engaged research, on and off, for about 10 years. Initially, this work involved Richard (Rick) Holliman and Trevor Collins who had been engaging through participatory design with a range of stakeholders to co-produce the Isotope community website. They asked me to work with them to produce a design that represented different contributions to this project. In a nod to Peter Taylor, a chemist working on the project, I designed a version of the Periodic Table. Each element in the table represents a contributor to the project (Holliman et al. 2009; see the back cover).

Fast forward to 2014 and the Engaging Opportunities Project discussed in this report. Rick and Trevor were looking to work with young people to represent another example of engaged research. We worked with Mark Russell, a teacher, and six students aged between 11 and 15 from Denbigh School. Through a process of participatory design we co-produced a way of representing this project that was meaningful to the young people who were involved. Figure 12 represents the finished project; for the overview of the process, see Collins et al. 2015.

My role was to support the design process. To do this, I needed to address a number of challenges. First, I would be working with a small group of young people who I had never met and who had no previous experience of design process. Second, we wanted to offer our design team genuine opportunities to have a voice in the design process, and to make decisions about the final product. Third, we had limited time with the students; the slots ranged from 20 to 40 minutes.

We held informal teaching sessions over lunch at intervals over a period of a school year with our student volunteers. My role was to scaffold the students' understanding of the design process. Specifically, I developed and provided three activities all aimed at stimulating design thinking, by inviting the students to consider: 1) What constitutes a design classic?; 2) How can we use shape, colour and form?; 3) and How does the interplay of images and text influence how ideas are represented?

Initially, we worked to establish rapport with the students. We showed them some of the designs from Isotope, and Rick offered an initial suggestion for how the project could be represented. However, he was very clear to the students that the final product would be of their choice. They took him at his word. Rick's initial ideas never saw the light of day again.



The purpose of the next activity was to ensure our students shared a broad notion of what constituted design. 'What constitutes a design classic?' fell into two parts, a brief introduction to three different design objects in silhouette. The participants worked in one group and had to identify the obscured objects. Upon identification I talked about each item. This was followed by a discussion regarding the relative merits of the objects which were: an angle-poise lamp, a stacking chair and a Nike logo swoosh.

The free-flowing conversation provided a platform for the students to begin to critique designs - a valuable aspect of the design process where everyone is free to contribute critical thinking about a group of objects which could be considered mundane or exciting but that all demonstrate design thinking. The students began to display independent thinking and were able to draw upon an impressive range of anecdotal conjecture on the topic of design.



The next activity involved a brief introductory lecture on the topic of colour and shape. In

this activity I wanted to augment the open conversation from the previous activity with something more structured and practical. Colour is said to have associations, but these associations vary depending on local factors leading to cultural differences on how colour is 'understood'. We discussed some of these differences. We also considered how primary shapes: a circle, a square and a triangle naturally infer certain qualities and how we - as designers - can use these inferences.



In a series of linked activities involving students and researchers I introduced sketching to the design process. It is important for designers to be able to communicate their ideas but there are no rules as to how this can be achieved. So as to avoid alienating anyone in the group who disliked drawing I produced a template of blank avatars. The students were asked to represent what they would like to see in an OU researcher when they engaged with students, by writing a keyword and annotating the avatar. (A group of researchers also conducted this activity, the results of which were shared with the students.) Constraints such as these can go either way. They can suffocate creative thinking or be a fulcrum for ideas.

After these sessions were concluded we consulted with the students about what they thought would be a suitable way to represent the project. We wanted them to have a think about the problem in readiness for our next session. None of us had any idea what might transpire from our sessions, although we assumed it might involve a logo or a poster of some kind.

Over the following sessions the students formed an agreement for their design. They worked through options on colour and text with the final output being wristbands with specific words marked onto the wristbands to echo sentiments derived from the activity with the avatars. My input was to maintain a tempo to their process and their design thinking by questioning their decisions and listening to their reasoning.

We discussed the outcome with Mark and the students during a reflective session on the experience of working collaboratively. I don't think any of us could have anticipated the outcome - it was a genuine product of participatory design thinking by the students and thus, I would argue, an example of successful engagement.

As a result of this work, I was delighted to be invited to design the final report for the Engaging Opportunities project. If we'd had more time, we would have reconvened the design team and co-produced the report with them.

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The School-University Partnerships Initiative was a four-year programme funded by Research Councils UK (RCUK) to create structured and strategic mechanisms for universities to work in partnership with secondary schools and Further Education (FE) colleges.

The aims of the School-University Partnerships Initiative were to:

Inspire the next generation by facilitating engagement between secondary school and FE college students and researchers to bring contemporary research into formal and informal learning contexts to enhance the curriculum and raise ambition.

Reach secondary school and FE college students from a diversity of backgrounds and abilities and engage the widest possible range of teachers and schools/colleges in ways which have maximum impact on teaching quality and learning.

Provide researchers (particularly those in the early stages of their career) with opportunities and training to engage with secondary school students and develop their transferable skills as outlined in the Researcher Development Framework.

Support secondary schools, FE colleges and universities to work together to create structured, strategic, sustainable and equitable mechanisms for school-university engagement which increases the breadth and quality of interactions between researchers and students.

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Twelve collaborations of school-university partnerships were supported across the four component nations of the UK enabling researchers' direct engagement with school and FE college students. University researchers worked with teachers and young people as they brought contemporary and inspirational research contexts into formal and informal learning to enhance and enrich curricula.

For further details about the 12 projects funded through this scheme, see: <http://www.rcuk.ac.uk/pe/PartnershipsInitiative>.

The National Coordinating Centre for Public Engagement (NCCPE) provided support and networking opportunities for the SUPIs throughout the funding period.

Resources from the SUPIs are hosted on the NCCPE site at:

<https://www.publicengagement.ac.uk/supi>

This report documents how The Open University worked in partnership with the Denbigh Teaching School Alliance to respond to this ambitious set of aims and objectives. Our aim was to connect young people with contemporary research and researchers through engaging opportunities.